TVGA 8900D & 9000C CARD USER'S MANUAL

Notice

The information in this document is subject to change in order to improve reliability, design, or function without prior notice and does not represent a commitment on the part of this company.

In no event will be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or the inability to use the product or documentation, even if advised of the possibility of such damages.

No part of this reference manual may be reproduced or transmitted in any form or by any means without the prior written permission of this company.

October 1993, Rev.1.0
All rights reserved.

Trademarks Acknowledgments

MultiSync is a trademark of NEC Home Electronics (USA) Inc. Multiscan is a trademark of Sony Corporation of America. MS Windows is a trademark of Microsoft Corporation. AutoCAD, Autoshade, Autosketch, and ADI are trademarks of Autodesk, Inc. TVGA is a trademark of Trident Microsystems, Inc. Hercules is a trademark of Hercules Computer Technology, Inc. WordPerfert is a trademark of WordPerfect Corporation. IBM, IBM PC, PC/AT, PS/2, and OS/2 are trademarks of International Business Machines Corp. All other trademarks are of their respective companies.

Contents

Section 1 — Introduction	1 - 1
Section 2 — Configuring The VGA Graphics Adapter	2 - 1
Section 3 — Software Utilities & Drivers Installation	3 - 1
Appendix	A ,B,C

Check List

In addition to this manual, you should have the following:

√ VGA Graphics Adapter
√ One Driver & Utility Diskettes

If any of these items are missing or damaged, contact your dealer.

Introduction

1.1 Features

Thank you for purchasing our VGA graphics board. The adapter works with your IBM PC/AT (or compatible) to bring you super-high resolution, 256-color capability, fast screen redraw, compatibility with most software and hardware.

Compatibility

- 486, 386, 286 and PC compatibles
- Register compatible with Hercules, MDA, CGA, EGA and VGA
- Non-interlaced or interlaced monitor support
- Compatible with Multi-Sync and PS/2 monitors
- 72Hz VESA standard (800x600 resolution)
- 1024x768 70Hz refresh

Resolution And Color Selection

(All modes non-interlaced except where indicated by an "I")

Memory	256K DRAM	512K DRAM	1MB DRAM***
640x400	—	256	256
640x480	16	16, 256	16, 256, 32K*, 16M**
768x1024	—	16-I	16-I
800x600	16	16, 256-I/NI	16, 256, 32K*
1024x768	—	16-I/NI	16-I/NI, 256-I/NI

*Same DRAM requirement for 64K COLOR

**32K/64K HiCOLOR and TRUE COLOR are optional features

*** 1M DRAM features apply for TVGA 8900D only

Extended Text Display

- 80-column text modes in 30, 43, and 60 rows
- 132-column text modes in 25, 30, 43 and 60 rows

Software Drivers Supported

- AutoCAD
- Autoshade
- GEM Desktop
- Lotus
- MS Windows
- MS Word
- Symphony
- Ventura
- WordPerfect
- Quattro Pro
- VESA BIOS Extension
- OS/2 Presentation Manager (Optional)

1.2 Monitor Support for Enhanced VGA Modes

Your monitor must be capable of displaying the mode you choose. Table 1 lists all available VGA display modes for the adapter, the monitors which support them, plus other information that may be useful.

Note that the color palette, i.e., the total number of possible colors to choose from, is 262,144 in all modes except for monochrome modes where the color palette is 2—black and the monitor phosphor color. For example, in mode 62 (1024x768-256 colors), the total colors available for display on the monitor at one time is 256 different colors from a palette of 262,144.

If your VGA card is equipped with a 16-bit or 24-bit RAMDAC, the total colors available for display on the monitor at one time is 32K/64K or 16M colors. Please check with your dealer to determine whether your VGA is equipped with a 16-bit or 24-bit RAMDAC.

TABLE 1. Display Modes

Mode (hex)	Type Format	Alpha Format	Resolution/ Colors	8514[1]	Fixed	Multisync[2] Freq.	Buffer Start	Char Size
0,1	text	40x25	320x200-16	Yes	Yes	Yes	B8000	8x8
2,3	text	80x25	640x200-16	Yes	Yes	Yes	B8000	8x8
0[3],1[3]	text	40x25	320x350-16	Yes	Yes	Yes	B8000	8x14
2[3],3[3]	text	80x25	640x350-16	Yes	Yes	Yes	B8000	8x14
0[4],1[4]	text	40x25	360x400-16	Yes	Yes	Yes	B8000	9x16
2[4],3[4]	text	80x25	720x400-16	Yes	Yes	Yes	B8000	9x16
4,5	graphics	40x25	320x200-4	Yes	Yes	Yes	B8000	8x8
6	graphics	80x25	640x200-2	Yes	Yes	Yes	B8000	8x8
7[3]	text	80x25	720x350-mono	Yes	Yes	Yes	B0000	9x14
7[4]	text	80x25	720x400-mono	Yes	Yes	Yes	B0000	9x16
D	graphics	40x25	320x200-16	Yes	Yes	Yes	A0000	8x8
E	graphics	80x25	640x200-16	Yes	Yes	Yes	A0000	8x8
F	graphics	80x25	640x350-mono	Yes	Yes	Yes	A0000	8x14
10	graphics	80x25	640x350-16	Yes	Yes	Yes	A0000	8x14
11	graphics	80x30	640x480-2	Yes	Yes	Yes	A0000	8x16
12	graphics	80x30	640x480-16	Yes	Yes	Yes	A0000	8x16
13	graphics	40x25	320x200-256	Yes	Yes	Yes	A0000	8x8
50	text	80x30	640x480-16	Yes	Yes	Yes	B8000	8x16
51	text	80x43	640x473-16	Yes	Yes	Yes	B8000	8x11
52	text	80x60	640x480-16	Yes	Yes	Yes	B8000	8x8
53	text	132x25	1056x350-16	Yes	Yes	Yes	B8000	8x14
54	text	132x30	1056x480-16	Yes	Yes	Yes	B8000	8x16
55	text	132x43	1056x473-16	Yes	Yes	Yes	B8000	8x11
56	text	132x60	1056x480-16	Yes	Yes	Yes	B8000	8x8
57	text	132x25	1188x350-16	Yes	No	Yes	B8000	9x14
58	text	132x30	1188x480-16	Yes	No	Yes	B8000	9x16
59	text	132x43	1188x473-16	Yes	No	Yes	B8000	9x11
5A	text	132x60	1188x480-16	Yes	No	Yes	B8000	9x8
5B[8]	graphics	100x75	800x600-16	Yes	No	Yes	A0000	8x8

5B [7]	graphics	100x75	800x600-16	No	No	Yes	A0000	8x8
5C [7]	graphics	80x25	640x400-256	Yes	Yes	Yes	A0000	8x16
5D [7]	graphics	80x30	640x480-256	Yes	Yes	Yes	A0000	8x16
5E [10,12]	graphics	100x75	800x600-256	No	No	Yes[9]	A0000	8x8
5E [8,11]	graphics	100x75	800x600-256	Yes	No	Yes	A0000	8x8
5E [8,11]	graphics	100x75	800x600-256	No	No	Yes	A0000	8x8
5F [7,10]	graphics	128x48	1024x768-16	Yes	No	Yes	A0000	8x16
5F [7,11]	graphics	128x48	1024x768-16	No	No	Yes[5]	A0000	8x16
60 [10]	graphics	128x48	1024x768-4	Yes	No	Yes	A0000	8x16
61 [6,7]	graphics	96x64	768x1024-16	No	No	Yes[6]	A0000	8x16
62 [8,10]	graphics	128x48	1024x768-256	Yes	No	Yes	A0000	8x16
62 [8,11]	graphics	128x48	1024x768-256	No	No	Yes[5]	A0000	8x16
6C [8,13]	graphics	80x30	640x480-16M	Yes	Yes	Yes	A0000	8x16
74/75[8,14]	graphics	80x30	640x480-32/64K	Yes	Yes	Yes	A0000	8x16
76/77[8,14]	graphics	100x75	800x600-32/64K	No	No	Yes[5]	A0000	8x8

Table Notes:

[1] 8514 is an IBM PS/2 monitor.

[2] Multisync monitors support both Analog and TTL operations (e.g. NEC Multisync 3D).

[3] EGA text modes with 8x14 and 9x14 character sizes and 350 lines vertical resolution.

[4] VGA text modes with 9x16 character size and 400 lines vertical resolution.

[5] Check to see if your multisync monitor supports the interlaced or non-interlaced versions of these modes (monitor must support horizontal scan rate of 48.7 KHz or 56.4 Khz for non-interlaced display).

[6] A portrait monitor is required to run this mode (e.g. Magics -15FP).

[7] Supported by 4 and 8 DRAM configurations only.

[8] Supported by 8 DRAM configuration only.

[9] Not every multisync monitor works (e.g., NEC 3D does not support low frequency).

[10] Interlaced mode.

[11] Non-interlaced mode.

[12] Supported by 4 DRAM configuration only.

[13] 24 bit RAMDAC required.

[14] 15/16 bit RAMDAC required.

Note: You may need to adjust your multi-frequency monitor to display these modes properly. Use the horizontal and vertical size and position controls on your monitor to display without distortion.

2.1 Hardware Configuration

Figure 1A is a diagram of the VGA graphics adapters. (TVGA 8900D)

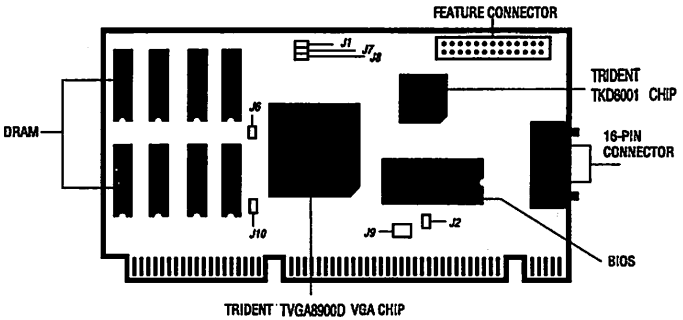


FIGURE 1A. 256k-512k-1.0MB Jumpers & Component Locations

Figure 1B is a diagram of the VGA graphics adapter. (TVGA 9000C)

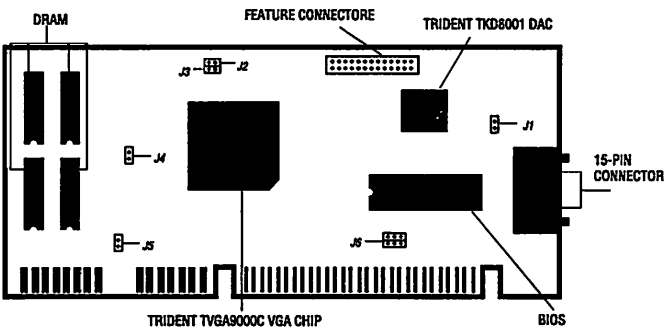


FIGURE 1B. Jumper & Component Locations

2.2 Jumper Settings

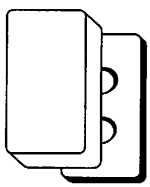
You can adapt the VGA adapter for special hardware configurations using the given jumpers on the card.

2.2.1A Enable/Disable Zero-Wait State (For 8900D only)

J1 and J2 allows you to enable/disable the adapter's ISA bus zero-wait state feature. When enabled (default), the CPU can transfer data to the VGA adapter at the zero-wait state rate through ISA bus. There are two zero-wait state stages that can be enabled or disabled. If your display exhibits pixel drop outs or the system hangs, use Jumper J2 to disable the first zero-wait state stage. If you still encounter problems, use Jumper J1 to disable the second zero-wait state stage. Figures 2-A and 2-B show how to enable/disable the zero-wait state stages.

FIGURE 2-A. J2 Enable/Disable First Stage Zero-Wait State

J2: Enable First Stage Zero-Wait State (Default: Pin 1 and 2 connected)



J2: Disable First Stage Zero-Wait State (Pin 1 and 2 open)

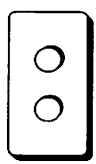
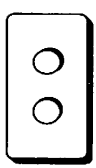
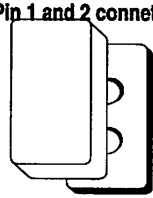


FIGURE 2-B. J1 Enable/Disable Second Stage Zero-Wait State

J1: Enable Second Stage Zero-Wait State (Default: Pin 1 and 2 open)



J1: Disable Second Stage Zero-Wait State (Pin 1 and 2 conneted)

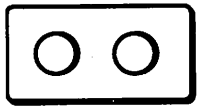


2.2.1B 256K/512K DRAM Select: J1 (For 9000C only)

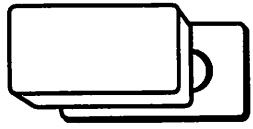
J1 allows you to select the memory configuration in your VGA adapter for 256K or 512K memory configuration. When 256K memory (2 DRAM) is installed in the VGA adapter, Jumper J1 needs to be in the open postion. When 512K memory (4 DRAM) is installed in the VGA adapter, Jumper J1 needs to be in the closed postion. Figure 2 illustrates the two setting for Jumper J1.

FIGURE 3. J5 Setting for Selecting Memory Configuration

J1: 512K DRAM Installed (Pin 1 and 2 open)



J1: 256K DRAM Installed (Pin 1 and 2 connected)



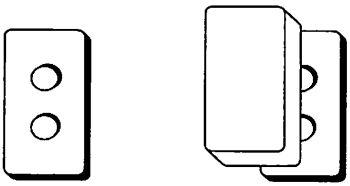
2.2.2 Select Scan Rate: J7 (for 8900D); J2 (for 9000C)

This allows you to configure the scan rates of extended VGA modes to be compatible with your multi-scanning monitor. **This is operational for 4 DRAM (512K) and 8 DRAM (1 MB) configurations only.** If your monitor can scan at 48.7 KHz, remove the Jumper pin across it. If in the open position this will allow non-interlaced display for 1024x768 modes and higher horizontal and vertical scan rates for 800x600-16 color (4 DRAM and 8 DRAM) and 800x600-256 (8 DRAM only). If your monitor cannot scan at 48.7KHz, leave the Jumper closed in the default position. This will give interlaced display for 1024x768 modes and reduced horizontal and vertical scan rates for the 800x600-16 color (4 DRAM and 8 DRAM) and 800x600-256 (8 DRAM). Figure 3 illustrates the two settings for this jumper.

FIGURE 4. Setting for Selecting Scan Rate

48.7 KHz Scan Rate
(Pin 1 and 2 open)

Default Scan Rate
(Pin 1 and 2 connected)



2.2.3 Enable/Disable Autodetect: J8 (for 8900D); J3 (for 9000C)

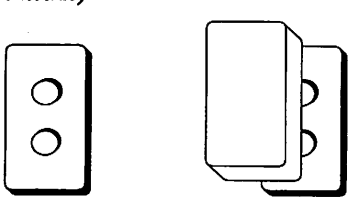
This allows you to enable/disable the BIOS Autodetect feature. When enabled (default) the BIOS will determine whether the Graphics Adapter can operate with an 8-bit or 16-bit BIOS interface, and will configure the BIOS interface accordingly. When disabled, the board will boot up in its default BIOS interface setting (generally 8-bit).

NOTE: If you have problems booting your system, set this jumper to disable autodetect, and place the card in an 8-bit slot and set J6, J9, J10 (for 8900D) or J4, J5, J6 (for 9000C) jumpers according to Figure 6-B.

FIGURE 5. Settings to Enable/Disalbe Autodetect

Enable Autodetect
(Default)

Disable Autodetect



2.2.4 8- or 16-Bit ISA Bus Slot Select

J6, J9, J10 (for 8900D) or J4, J5, J6 (for 9000C) are used to select whether the VGA adapter is seated in a 8-bit or 16-bit slot.

FIGURE6-A. setting for 16-bit slot (Default)

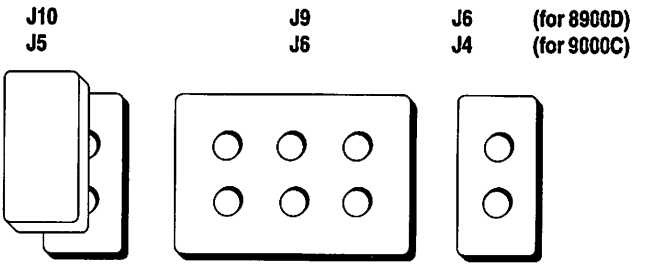
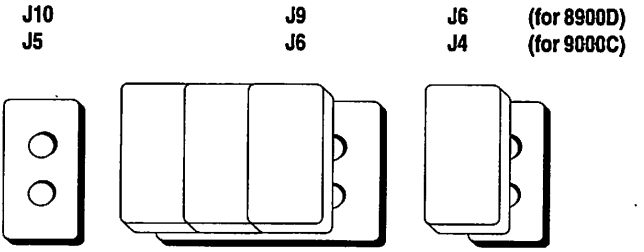


FIGURE 6-B. setting for 8 bit slot



3.1 Software Drivers & utilities Installation procedures

To start the program, insert Driver & Utilities Diskette into drive A. From drive A type: **README [Enter]**. Choose whether you would like the contents of the utility disk expanded to C:, D:, or E: drive. Be sure the destination hard drive has at least 3MB of memory available.

Once all files have been copied/expanded to the hard drive, the driver/ utility program may be started by typing README from the TVGAUTIL directory on your selected hard drive.

Remark :

For update information, please refer to the file (if exist) README.1st in the Display Drivers & Utilities diskette.

0737 773022.

Appendix A

Pinout and Sync Frequencies

A1.1 Analog Color Display Pinouts

Table 2 shows the VGA Graphics Adapter analog color display pinouts.

TABLE 2. Analog Color Display Pinouts

Pin	Function
1	Red Video[1]
2	Green Video[1]
3	Blue Video[1]
4	Not Used
5	Ground
6	Red Return (ground)
7	Green Return (ground)
8	Blue Return (ground)
9	Key (no pin)
10	Sync Return (ground)
11	Monitor ID (not used)
12	Monitor ID[2]
13	Horizontal Sync
14	Vertical Sync
15	Not Used

[1] Analog monochrome-type monitors use green video for all video input and ignore red video and blue video.

[2] Monochrome monitors connect Pin 12 to ground. Color monitors leave Pin 12 open. The adapter uses Pin 12 to detect the monitor type.

A1.2 Video Signals

Analog:

Black Level = 0V

Full Intensity Level = +0.7V

A1.3 Sync and Polarity Specifications

Table 3 lists the horizontal sync, vertical sync, and polarity for all available VGA modes. If you are not sure if your monitor will support a particular mode, check your monitor's specification for horizontal sync, vertical sync, and polarity against these tables.

TABLE 3. Sync and Polarity Specifications

Mode (h)	Clock (MHz)	Horz Sync (KHz)	Vert Sync (Hz)	Polarity (H, V)
0,1	25.175	31.4	70	+, -
2,3	25.175	31.4	70	+, -
0[1],1[1]	25.175	31.4	70	-, +
2[1],3[1]	25.175	31.4	70	-, +
0[2],1[2]	28.322	31.5	70	+, -
2[2],3[2]	28.322	31.5	70	+, -
4,5	25.175	31.4	70	+, -
6	25.175	31.4	70	+, -
7	28.322	31.5	70	+, +
7+	28.322	31.5	70	+, +
D	25.175	31.4	70	+, -
E	25.175	31.4	70	+, -
F	25.175	31.4	70	-, +
10	25.175	31.4	70	-, +
11	25.175	31.4	60	-, -
12	25.175	31.4	60	-, -
13	25.175	31.4	70	+, -
50	25.175	31.5	60	-, -
51	25.175	31.5	60	-, -
52	25.175	31.5	60	-, -
53	40.000	31.2	70	-, +
54	40.000	31.2	60	-, -
55	40.000	31.2	60	-, -
56	40.000	31.2	60	-, -
57	44.900	31.2	70	-, +
58	44.900	31.2	60	-, -
59	44.900	31.2	60	-, -
5A	44.900	31.2	60	-, -
5B[8]	36.000	35.2	56	-, -
5B[3,9,10]	50.350	48.0	72	+, +

TABLE 3. Sync and Polarity Specifications - Continued

Mode (h)	Clock (MHz)	Horz Sync (KHz)	Vert Sync (Hz)	Polarity (H, V)
5C[3]	50.350	31.5	70	-, +
5C[4]	25.175	31.5	70	-, +
5D[3]	50.350	31.5	60	-, -
5D[4]	25.175	31.5	60	-, -
5E[5,7]	57.272	29.5	90	+, +
5E[4,6,8]	36.000	35.2	56	-, -
5E[4,6,9]	50.350	48.0	72	+, +
5F[4,5,8]	44.900	35.5	86	+, +
5F[4,6,9,10]	65.000	48.7	60	+, +
5F[4,6,9,12]	75.000	56.4	70	+, +
60[5]	44.900	35.5	86	+, +
61[11]	44.900	37.9	70	+, +
62[4,5,8]	44.900	35.5	86	+, +
62[4,6,9,10]	65.000	48.7	60	+, +
62[4,6,9,12]	75.000	56.4	70	+, +
6C[4,6,13]	75.000	31.4	60	-, -
74/75[4,6,14]	50.350	31.4	60	-, -
76/77[4,6,14]	72.000	35.2	56	-, -

Table Notes:

1 EGA text modes with 8x14 and 9x14 character sizes and 350 lines vertical resolution.

2 VGA text modes with 9x16 character size and 400 lines vertical resolution.

3 Supported by 4 and 8 DRAM configurations only.

4 Supported by 8 DRAM configuration only.

5 Interlaced mode.

6 Non-interlaced mode.

7 Supported by 4-DRAM configuration only.

8 Jumper J7 connected. (for 8900D); J2 connected (for 9000C)

9 Jumper J7 open. (for 8900D); J2 open (for 9000C)

10 High refresh monitor required with horizontal frequency greater than 48KHz.

11 Portrait monitor.

12 High refresh monitor required with horizontal frequency greater than 56 KHz.

13 24 bit RAMDAC required.

14 15/16 bit RAMDAC required.

Appendix B
DRAM Upgrades

The VGA adapter can be configured with two, four or eight pieces of 256Kx4 (80 nanosecond) Fast Page Mode DRAM.

Upgrading from two to four DRAM allows you to display up to 1024x768-16 colors. Upgrading from four to eight DRAM allows you to display up to 1024x768-256 colors. It also speeds up the performance by a bit. To purchase DRAM, contact your dealer, a local electronics store, or a mail order house (which advertise in publications such as Computer Shopper, PC Magazine, PC World, and BYTE). Order 256Kx4 Fast Page Mode DRAM (sometimes called one megabit DRAM). DRAM speed should be 80 nanoseconds.

Upgrading From 256KDRAM to 512K or 1MB

1. Place the adapter component side up on a firm, flat, non-static surface (avoid wool materials). The gold edge connector should be facing you.

2. Insert the DRAM (two pieces if upgrading to 512K and 6 pieces if upgrading to 1 MB) into the sockets provided on the upper left-hand corner of the board. DRAM should be added in columns according to the diagrams on the next page. The notched side of the DRAM should be facing down and insert a jumper block on Jumper J1 (for 9000C). Be careful not to bend the pins. Be sure each DRAM is seated snugly.

3. To check that the DRAM has been installed properly, place the board in your system and turn the system ON. A copyright and the amount of video DRAM detected will appear in the upper left-hand corner of the initial boot screen. If the amount of DRAM detected is the same as the amount installed (512K or 1MB), you have installed the DRAM successfully. If the amount of DRAM detected is 256K, remove the adapter from your system. Check to see that all pins fit snugly into their respective socket holes (i.e., no pins bent underneath the DRAM chip or sticking out). Be sure the notches for each DRAM are facing the same way.

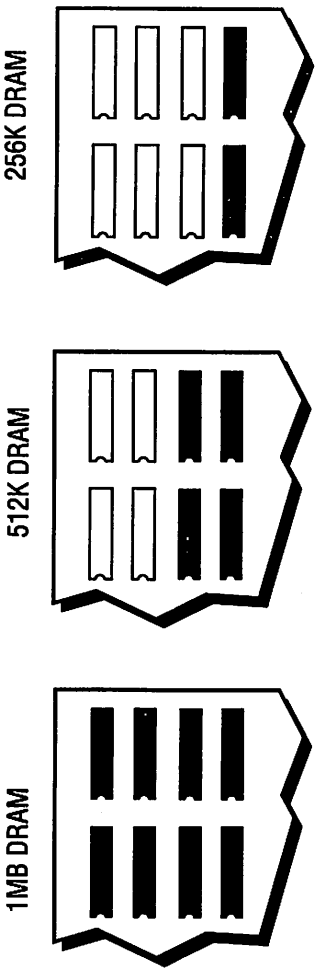


Figure B-1. DRAM Upgrade (For 8900D)

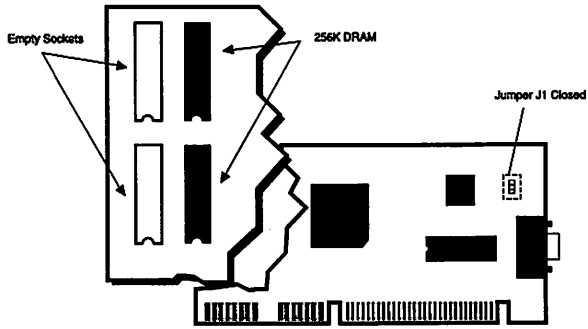


Figure B-2A. 256K DRAM (For 9000C)

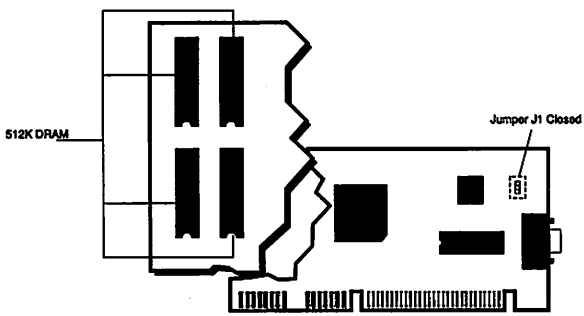


Figure B-2B. 512K DRAM UPGRADE (For 9000C)

Appendix C
FCC Compliance Statement

Model: TVGA8900D	**FCC ID: HNG890CL-BBD1TIA1**
Model: TVGA9000C	**FCC ID: HNG900C-BBD5TITA1**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measure:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problem." This booklet is available from the U.S.Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

The user is cautioned that changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Note: In order for an installation of this product to maintain compliance with the limits for a class B device, shielded cables and power cord must be used.

P/N : 182-898U1000-NG